

In re Patent Application of
BERNADO ET AL.
Serial No. 09/747,786
Filed: DECEMBER 22, 2000

REMARKS

Applicants again thank the Examiner for the careful and thorough examination of the present application, and for correctly withdrawing the previous rejection in view of our arguments presented in the previous response. Claims 9-32 remain pending in the application. Favorable reconsideration is respectfully requested.

I. The Invention

As shown in FIG. 2, for example, the disclosed invention is directed to a robust communication system for transmissions through a noisy medium. The communication system has structural and functional features useful in spread-spectrum modulation, but is based on a chaotic carrier. The spread-spectrum communication system is based on modulating the chaotic carrier and on the use of an incoherent discriminator for robust transmissions through the noisy medium.

II. The Claims are Patentable

Claims 9-32 were rejected in view of Abarbanel et al. (U.S. Patent No. 5,923,760) in various combinations with non-patent citation J. Lee et al. (Secure Communication Using chaos, IEEE Global Telecommunications Conference), Cutler et al. (U.S. Patent No. 5,847,960), Applicants' background discussion, Giacomini (U.S. Patent No. 6,016,078) and/or Brenman et al. (U.S. Patent No. 4,590,942) for the reasons set forth on pages 2-15 of the Office Action. Applicants contend that Claims 9-32 clearly define over the cited references, and

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in view of the following remarks, favorable reconsideration of the rejections under 35 U.S.C. §103 is requested.

Independent Claim 9 is directed to a communication system comprising a transmission channel, a signal source for providing a discrete signal, and a chaotic modulator for modulating the discrete signal for transmitting over the transmission channel. An incoherent discriminator receives the modulated discrete signal from the transmission channel. The use of an incoherent discriminator in accordance with the present invention advantageously allows the discrete signal to be reconstructed using a structure that is different than the structure used to modulate the discrete signal for transmitting over the transmission channel. Independent method Claim 25 is similar to independent device Claim 9, and is directed to a method for transmitting a signal over a transmission channel as discussed above.

Independent Claim 17 is directed to a communication system comprising a digital signal source for providing a digital signal, a chaotic modulator for modulating the digital signal for transmitting over a transmission channel, and an incoherent discriminator for receiving the modulated digital signal from the transmission channel. The incoherent discriminator comprises a high-pass filter, a rectifier connected to an output of the high-pass filter, and a low-pass filter connected to an output of the rectifier.

Independent Claim 21 is directed to a communication system comprising a digital signal source for providing a digital signal, a chaotic modulator for modulating the digital signal for transmitting over a transmission channel, and an

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incoherent discriminator for receiving the modulated digital signal. The incoherent discriminator comprises a low-pass filter, a null-threshold comparator connected to an output of the low-pass filter for providing a square-wave output signal, and a divider connected an output of the comparator for scaling the square-wave output signal.

The communication system in accordance with the present invention advantageously operates in a noisy medium based upon a chaotic carrier.

It is these combinations of features which are not fairly taught or suggested in the cited references and which patentably define over the cited references.

As discussed in the previous response, the Abarbanel et al. patent discloses a communication system in which a chaotically generated signal is modulated using a transmitter chaotic signal generator 20. After transmission, the received signal is applied to a receiver chaotic signal generator 30, and the chaotic signal is recovered. The chaotic signal is used to demodulate the received signal for recovery of information. As correctly acknowledged by the Examiner, the Abarbanel et al. system does not include an incoherent discriminator as claimed.

The Examiner has now relied upon the Lee reference as allegedly teaching the use of an incoherent receiver in a chaotic communication system. The Examiner has characterized the power level comparison of the dynamic error of the data streams in Lee as meeting the feature of an incoherent receiver. Furthermore, the Examiner asserts that it would then be obvious to combine such a feature of Lee with the system of

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Abarbanel et al. to arrive at the claimed invention. However, the combination of references fails to produce the claimed invention, and the Examiner is using impermissible hindsight reconstruction to selectively combine the disjointed prior art references in an attempt to produce the claimed invention in a manner that is not fairly taught or suggested by the prior art.

Indeed, Abarbanel et al. does not include an incoherent discriminator for receiving the modulated digital signal from the transmission channel because the chaotic modulator in the transmitter is substantially identical to the corresponding demodulator in the receiver. In other words, the system of Abarbanel et al. teaches away from the use of an incoherent discriminator for receiving the modulated signal from the transmission channel.

The Lee et al. article discloses a secure communication system using a chaotic system. The secure communication system in Lee et al. does not require synchronization of the receiver to the transmitter because the power level of the dynamic error of each data stream is compared.

The Examiner cited Culter et al. as disclosing a low-pass filter, Giacomini as disclosing a null-threshold comparator, and Brenman et al. as disclosing a divider. However, none of these references makes up for the deficiencies of Abarbanel et al. and Lee references as discussed above.

As the Examiner is aware, to establish a prima facie

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case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim features. The initial burden is on the Examiner to provide some suggestion of the desirability of doing what the Applicants have done. To support the conclusion that the claimed invention is directed to obvious subject matter, either the reference must expressly or impliedly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the reference. Both the suggestion to make the claimed combination and the reasonable expectation of success must be founded in the prior art and not in Applicants' disclosure.

There is simply no teaching or suggestion in the cited references to provide the combination of features as claimed. Accordingly, for at least the reasons given above, Applicants maintain that the cited references do not disclose or fairly suggest the invention as set forth in Claims 1, 17, 21 and 25. Furthermore, no proper modification of the teachings of these references could result in the invention as claimed. Thus, the rejections under 35 U.S.C. §103(a) should be withdrawn.

It is submitted that the independent claims are patentable over the prior art. In view of the patentability

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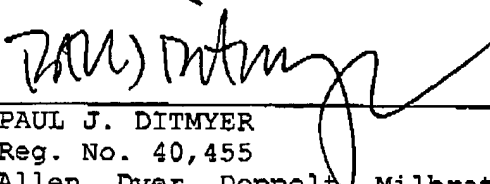
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of the independent claims, it is submitted that their dependent claims, which recite yet further distinguishing features are also patentable over the cited references for at least the reasons set forth above. Accordingly, these dependent claims require no further discussion herein.

III. Conclusion

In view of the foregoing remarks, it is respectfully submitted that the present application is in condition for allowance. An early notice thereof is earnestly solicited. If, after reviewing this Response, there are any remaining informalities which need to be resolved before the application can be passed to issue, the Examiner is invited and respectfully requested to contact the undersigned by telephone in order to resolve such informalities.

Respectfully submitted,


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CERTIFICATE OF FACSIMILE TRANSMISSION

I HEREBY CERTIFY that the foregoing correspondence has
been forwarded via facsimile number 703-872-9306 to the
Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-
1450 this 9th day of May, 2005.

